CLAIMS

1. An apparatus comprising an imaging device, a range finder, and a processor capable of receiving and processing image and range signals to construct a three-dimensional image from said signals.

2. The apparatus according to claim 1, wherein the imaging device comprises a camera.

3. The apparatus according to either preceding claim, wherein the imaging device comprises a digital video camera.

4. The apparatus according to any preceding claim 2, wherein the imaging device is capable of zoom functions.

5. The apparatus according to any preceding claim, wherein the apparatus includes a display device to allow a user to view a target area using the imaging device.

6. The apparatus according to any preceding claim, wherein the apparatus includes a pan and tilt unit for panning and tilting of the range finder and/or imaging device.

7. The apparatus according to claim 6, wherein the pan and tilt unit comprises a first motor for panning of the range finder and/or imaging device, and a second motor for tilting of the range finder and/or imaging device.

8. The apparatus according to claim 7, wherein the

first and second motors are controlled by the processor.

9. The apparatus according to any one of claims 6 to 8, wherein the pan and tilt unit includes first and second digital encoders for measuring the angles of pan and tilt respectively.

10. The apparatus according to claim 9, wherein the outputs of the first and second encoders are fed to the processor.

11. The apparatus according to any preceding claim, wherein the image is digitised.

12. The apparatus according to any preceding claim, wherein the image comprises a plurality of pixels.

13. The apparatus according to any preceding claim, wherein the image comprises a captured image.

14. The apparatus according to any preceding claim, wherein the range finder comprises a laser range finder.

15. The apparatus according to any preceding claim, wherein the range finder is bore-sighted with the imaging device.

16. The apparatus according to any preceding claim, wherein the apparatus includes a compass and an inclinometer and/or gyroscope.

17. The apparatus according to any preceding claim, wherein the apparatus further includes a position fixing system for identifying the geographical position

of the apparatus.

18. The apparatus according to claim 17, wherein the position fixing system is a Global Positioning System (GPS).

19. The apparatus according to any preceding claim, wherein the apparatus is operated by remote control.

20. The apparatus according to any preceding claim, wherein the apparatus is controlled by an input device.

21. The apparatus according to claim 20, wherein the input device facilitates operation of a particular function of the apparatus.

22. A method of generating a three-dimensional image of a target area, the method comprising the steps of providing an imaging device, providing a range finder, operating the imaging device to provide an image of the target area, and subsequently measuring the distance to each of a plurality of points by scanning the range finder at preset intervals relating to the points.

23. A method according to claim 22, wherein the method includes the further steps of

obtaining a focal length of the camera;
obtaining a field of view of the camera; and
obtaining a principal distance of the camera.

24. A method according to claim 22 or claim 23, wherein the method includes the further steps of

digitising the image to provide a plurality of pixels within the digital image;
calculating horizontal and vertical angles between a reference point in the image and each pixel;

moving the range finder through the horizontal and vertical angles whereby the range finder is directed at each pixel in sequence; and

actuating the range finder to obtain a range to the target corresponding to the position of the pixel.

25. A method according to claim 24, wherein the method includes the additional steps of

assigning x and y coordinates for each pixel within the image;

correlating the range to the target with each pixel within the image; and

calculating three dimensional coordinates of the pixels to reconstruct a three dimensional image of the target area.

26. A method according to claim 25, wherein the method includes the additional steps of

plotting each of the three dimensional points of the image; and

superimposing a wire frame over the image connecting each of the three dimensional points.

27. A method according to claim 26, wherein the method includes the additional step of superimposing the image on the wire frame to reconstruct a three dimensional image of the target area.

28. A method according to any one of claims 24 to 27, the method including the further steps of

obtaining a horizontal offset and a vertical offset between an axis of the camera and an axis of the range finder;

calculating the horizontal and vertical offsets in terms of pixels;

calculating the difference between the horizontal and vertical offsets in terms of pixels and the x and y coordinates of the target pixel; and

calculating the horizontal and vertical angles.

29. A method according to any one of claims 24 to 28, wherein the method includes the further steps of

providing the range finder and/or camera on a pan and tilt unit;

providing angle encoders to measure the angles of pan and tilt of the unit;

instructing the pan and tilt unit to pan and tilt the range finder and/or camera through the vertical and horizontal angles;

measuring the horizontal and vertical angles using the encoders;

verifying that the angles through which the range finder and/or camera are moved is correct;

obtaining horizontal and/or vertical correction angles by subtracting the measured horizontal and vertical angles from the calculated horizontal and vertical angles;

adjusting the pan and tilt of the range finder and/or camera if necessary; and

activating the range finder to obtain the range to the target.